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SYSTEMS DIVISION

THE LINK ARCHIVAL DIGITAL STORAGE AND RETRIEVAL SYSTEM

The Link Archival Digital Storage and Retrieval System has been designed specifically to increase the cost-effectiveness of long-term storage and retrieval of digital data.

The features offered by this system are made possible by the use of one of the lowest-cost high-density storage media known to man--film; and by the eight years of Link's experience in designing filmed data conversion systems.

TECHNICAL FEATURES

Transcription and verification of magnetic tape data at magnetic tape speeds is independent of computer control and does not interfere with scheduled usage of existing facilities.

Verification of 100% of transcribed data is done after film processing to eliminate any possibility of errors or mistakes.

Data blocks up to 10,560 16-bit words can be accommodated.

Automatic recording of data block identification is provided.

Retrieval of data is under computer control with direct data channel communication for maximum speed and efficiency.

Rapid access for selective data retrieval provided by searching at 100 data blocks per second (7 times faster than magnetic tape.)

Excellent long-term storage stability eliminates need for periodic exercising of material to avoid "print-through."

ECONOMIC FEATURES

Greater than 15:1 reduction in material costs.

Greater than 35:1 volumetric reduction of stored data.

Savings in material can amortize equipment costs in as little as 12 months.

High speed of operation offers capacity to transcribe existing stored data and accommodate increases in the quantities of future inputs.

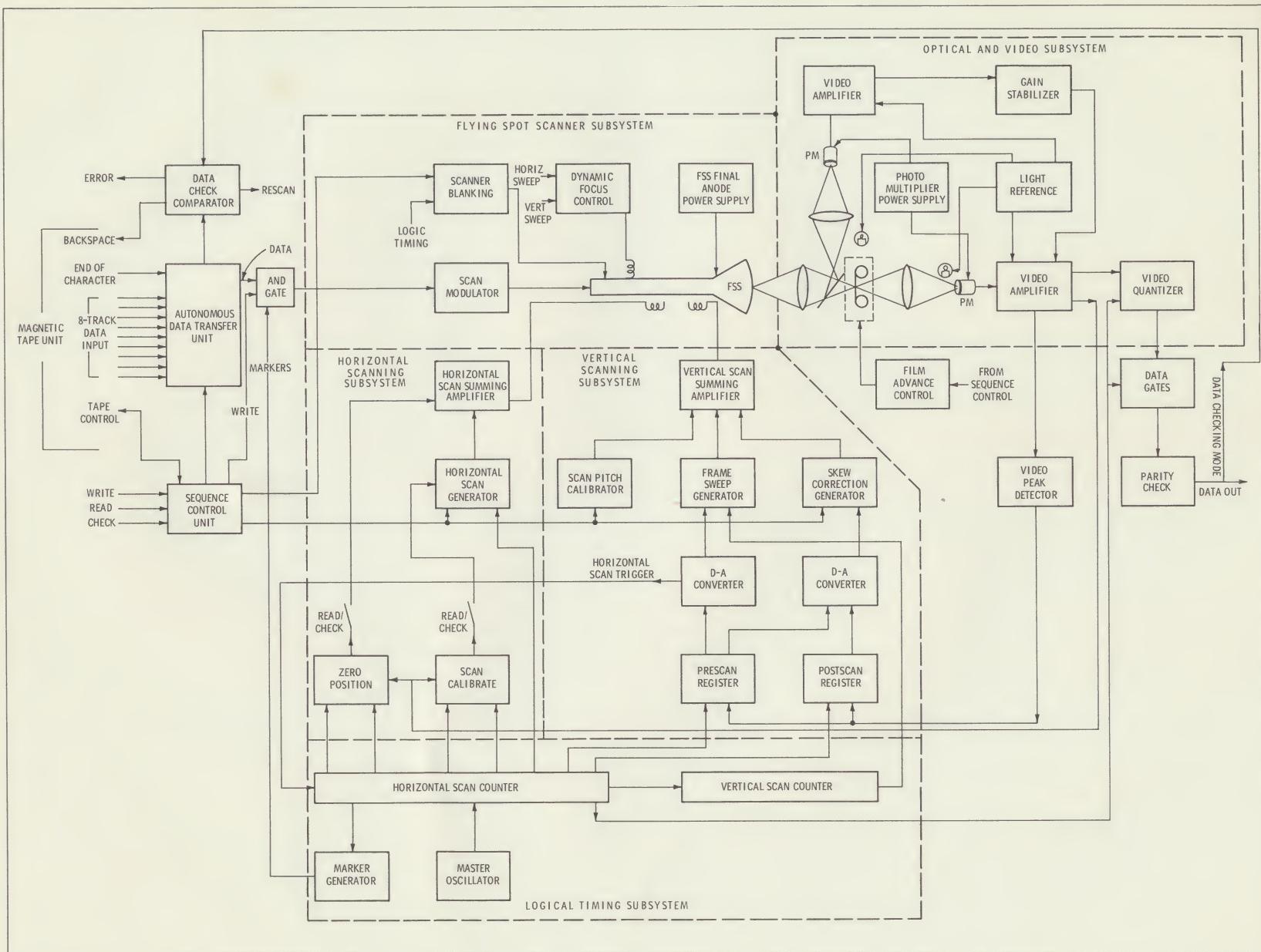
Existing magnetic tape will be freed for continual re-usage.

SYSTEM OUTLINE

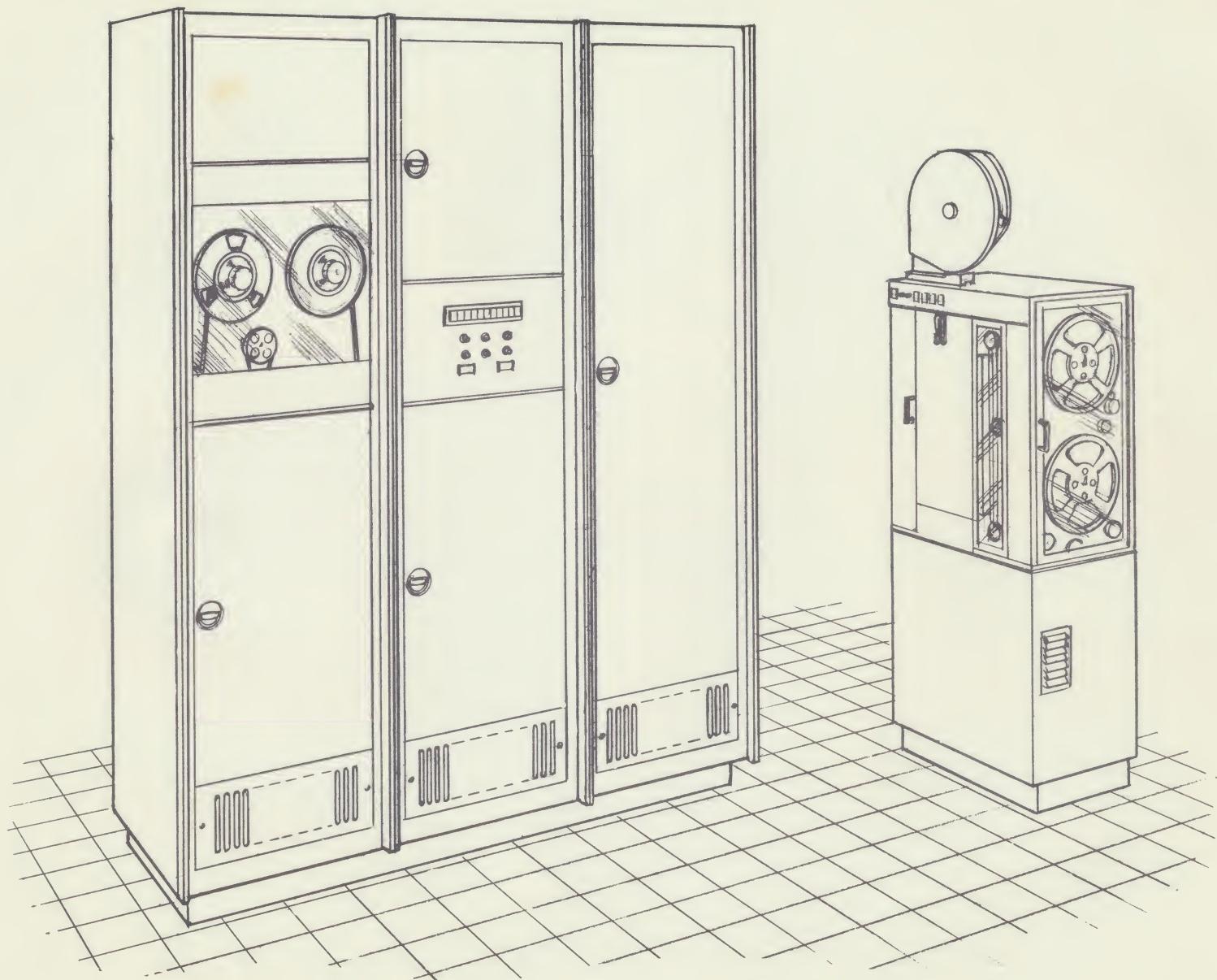
The Link Archival Digital Storage and Retrieval System consists of two major elements: (1) a magnetic tape unit, and (2) a flying spot scanner film reader/recorder (see Figure 1-1) which will be interfaced with a digital computer. Film processing facilities will also be required. The magnetic tape unit may be mounted as an integral part of the main cabinet (see Figure 1-2) or, if preferred, it may be housed in a separate cabinet.

The right-hand bay of the main cabinet will contain the optical subsystem and film transport assembly. These will be totally enclosed within a clean air environment unit which will provide temperature and humidity stabilization. The flying spot scanner assembly is in the adjacent center bay, and access to both units will be made through locking hinged doors.

The digital logic system and some analog units will be on printed circuit boards assembled on rack-mounted shelves



Block Diagram, Digital Data Storage System



Artist's Conception of Digital Data Storage System

behind the optical unit, with rear access for servicing. The video processing unit and the remaining analog control units will be assembled on a sub-unit adjacent to the cathode-ray tube assembly. The stabilized power supplies will be distributed in the base of the cabinet, with adequate air cooling provided.

The system will have three modes of operation: "WRITE," "CHECK," and "READ." In the "WRITE" mode, information from the tape is written onto unexposed film in the form of a dot matrix. A set of markers is also recorded which are used in the "CHECK" and "READ" modes to locate the precise position of the dot matrix. In addition, a machine-readable data block identification code is recorded to facilitate the selective retrieval of data.

In the "CHECK" mode, the developed film will be verified against the original tape. In essence, therefore, this becomes a Read operation.

In both the "WRITE" and "CHECK" modes, the entire system operates independently from the computer. In the "READ" mode, however, the system will read the data on command, and under control, of the computer. While operating in this mode, the film reader will present to the computer all the characteristics of a magnetic tape unit (having a read-only capability). It can be seen, therefore, that supplementing existing facilities with the Link Archival Digital Storage and Retrieval System requires no additional interfacing and will in no way interfere with current operations.

A more complete description of each part of the system and the principle of operation is to be found in Section 3 of this proposal.

SPECIFICATIONS AND SUBSYSTEM UNITS

SYSTEM SPECIFICATIONS

Operating Modes: "WRITE," "CHECK," and "READ"

Interface Supplied: "WRITE" and "CHECK" Modes: direct to 9-track. 800-bpi magnetic tape unit. "READ" Mode: to computer direct data channel

Data Transfer Rate: Compatible with magnetic tape units operating at speed up to 120 inches per second (9-track, 800-bpi tape)
(Input and Output)

Mean Data Transfer Rate: Variable with data block length

Storage Density: 870,000 bits per square inch;
useable film area

Film Size: 16mm, ASA Format 2R-1500

Film Magazine Capacity: 1000 feet

Film Processing: Off-line, using recommended Eastman Kodak Viscomat 16mm Processor

Data Storage (Maximum Block Length): 10,560 16-bit words

Error Rate:	Will not exceed the following when comparing the data read from the film with the corresponding data derived from the magnetic source tape: a) A single error word between two adjacent correct words, will not occur at a frequency greater than once per 100 16-bit words. b) Two adjacent errors words will not occur at a frequency greater than once per 10,000 16-bit words. c) Three or more adjacent error words will not occur at a frequency greater than once per 1,000,000 16-bit words.
Data Block Identification:	By machine-readable code, automatically recorded in "WRITE" Mode.
Search Speed:	100 blocks (3360 16-bit words each block) per second. Under computer control.